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(56) Documents Cited

GB 1350618 A US 5710945 A US 5365291 A
US 5093677 A US 4752791 A US 4114839 A

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(54) Abstract Title

Helicopter mission pod

(57) A pod 10, for supporting equipment such as a camera module 44, landing light 60, searchlight 62, loudspeaker system 65, audio amplifier 66, electronics control unit 67, and global positioning system/communications microwave downlink 72, comprises a chassis formed from tubular structural members and brackets the chassis having at least two (preferably four) anchorage points 20 for securing the pod 10, beneath a helicopter, thereby freeing the helicopter cabin floor of mission equipment. The pod may comprise a raised section 18 with a turret 41, and forward fairing 45. The pod also comprises bulkheads 47-49, and openable doors 54, defining interior compartments, and a rear fairing 51. Details of equipment supporting arrangements are disclosed.

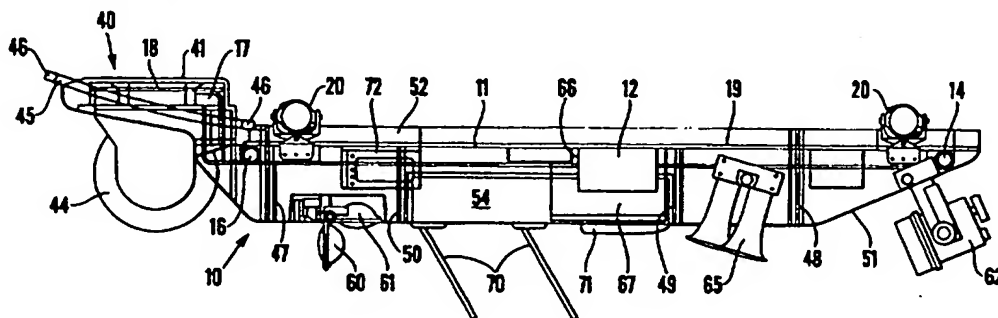


Fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

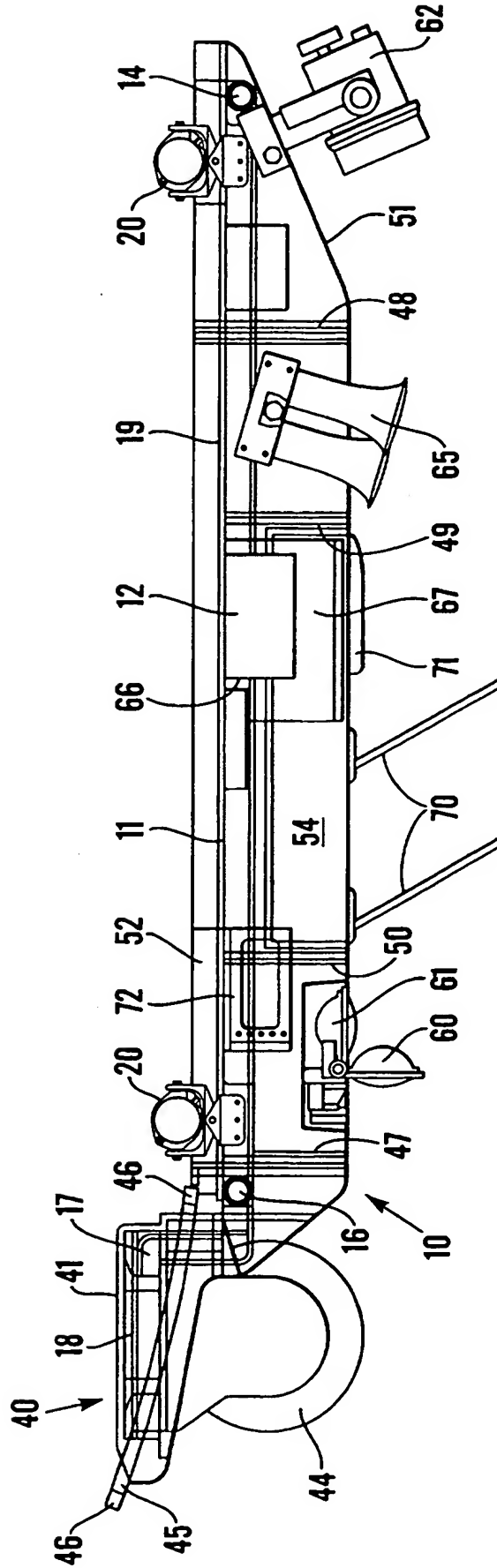


Fig. 1

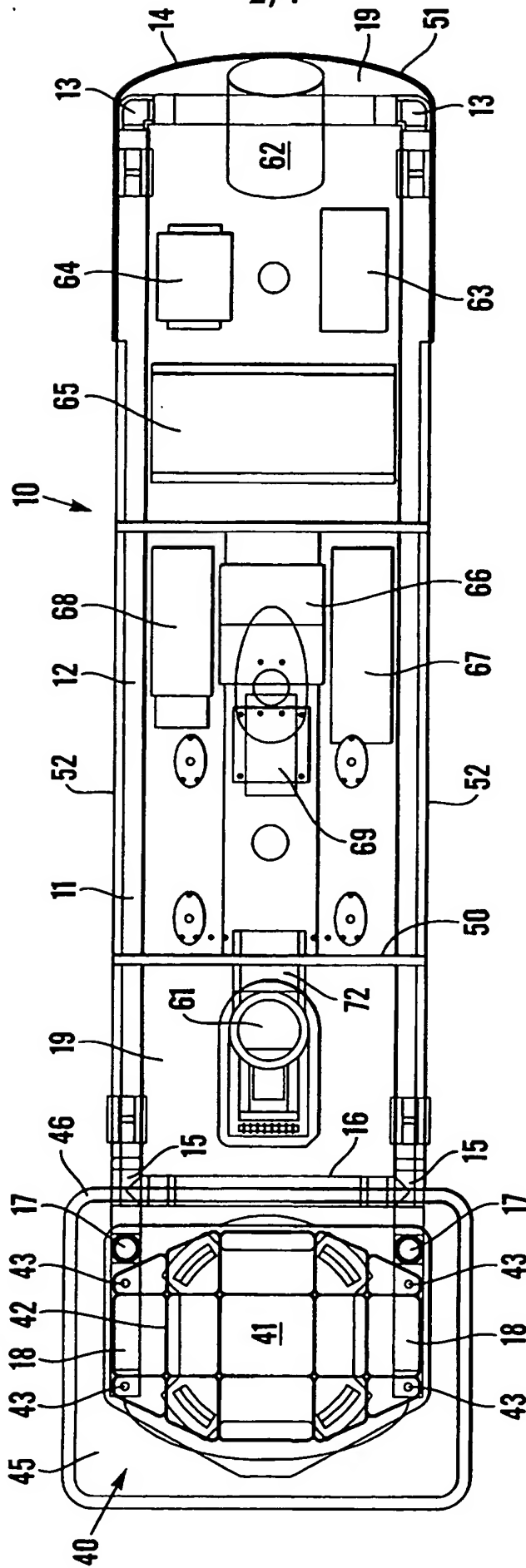


Fig.2

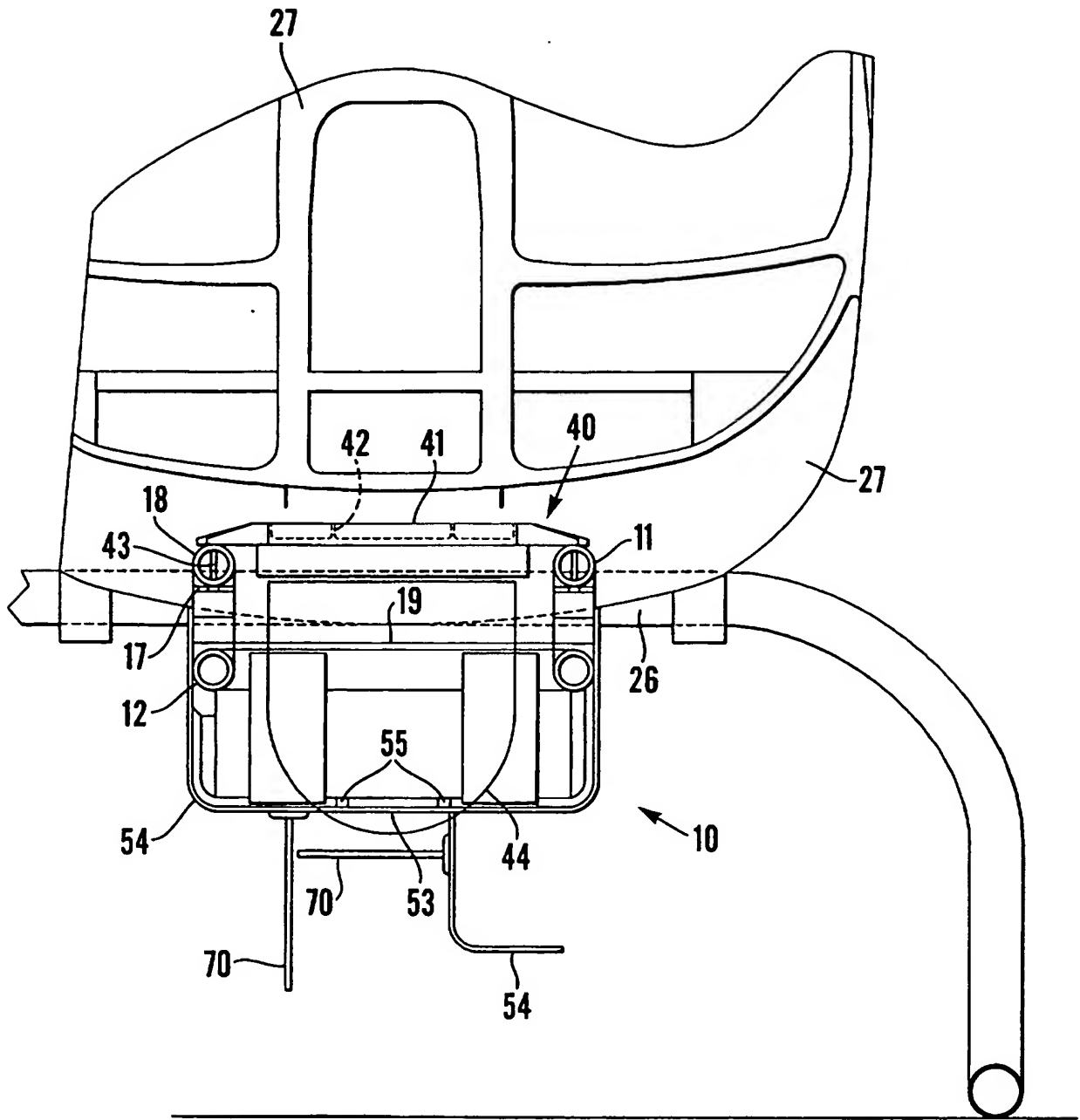


Fig.3

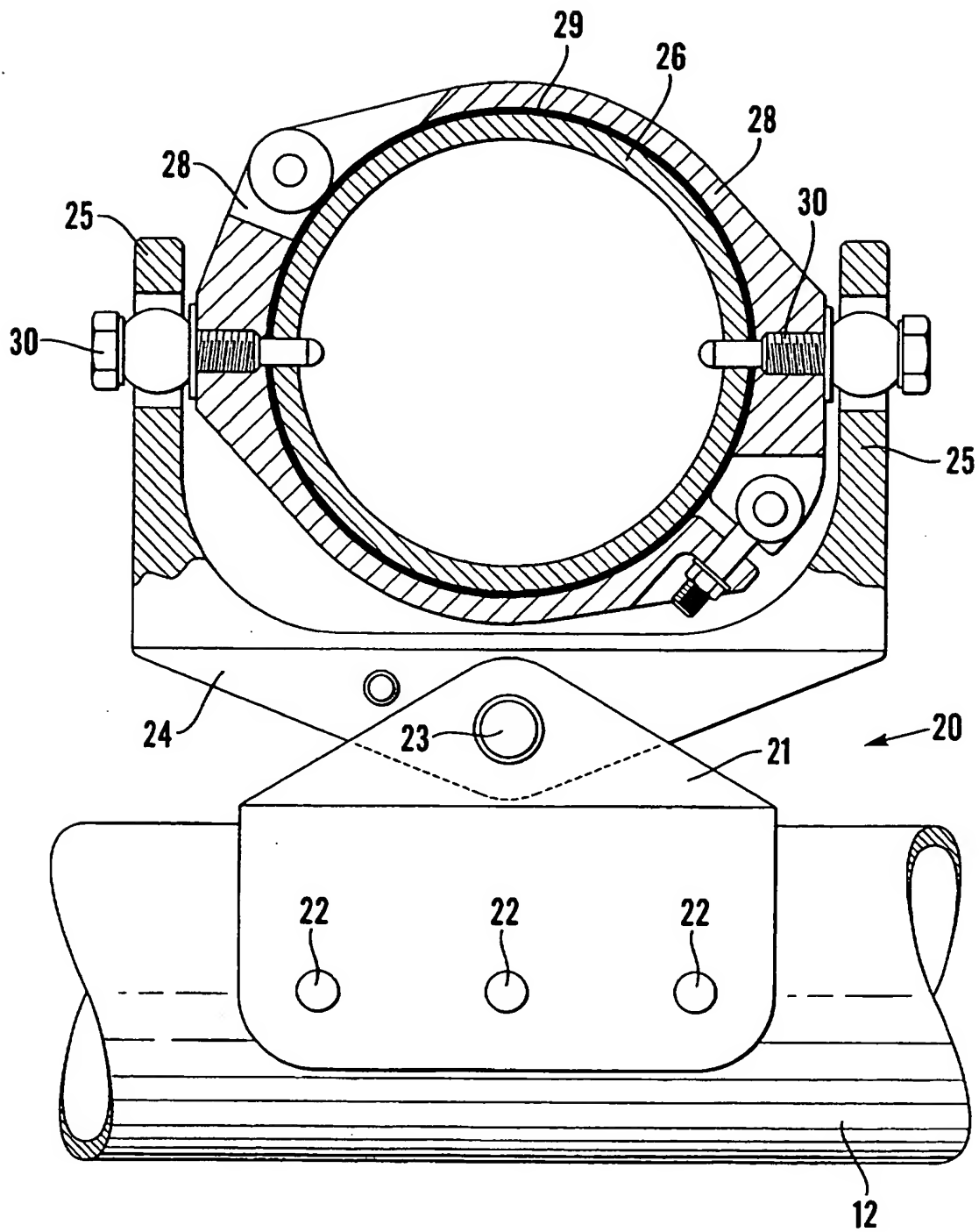


Fig.4

HELICOPTER MISSION SYSTEM

Helicopter flights are always flown for particular purposes, and such a purpose together with the flight itself and the operation of the helicopter and crew are usually referred to as a mission. The range of missions which helicopters can carry out is almost limitless, including police action, air rescue, surveying, fire fighting, electronic news-gathering, VIP transport, military action and surveillance. The helicopter is fitted with basic flight, navigation and communication equipment as standard, but additional or supplementary equipment is usually required for the helicopter for any particular mission, such mission equipment being normally referred to as a helicopter mission system.

It is an object of the present invention to provide an improved helicopter mission system.

In accordance with the present invention, a helicopter mission system comprises a mission pod having a chassis for supporting mission equipment and provided with at least two anchorage points attached to the chassis for mounting the mission pod beneath a helicopter.

Preferably the chassis and anchorage points are arranged for mounting the mission pod along the centre line of the helicopter.

Preferably the mission pod is provided with at least three anchorage points attached to the chassis for mounting the mission pod beneath the helicopter.

Preferably also the chassis comprises a pair of longitudinal structural members each being provided with at least one of the anchorage points.

Preferably further the chassis is provided with at least four anchorage points attached to the chassis for mounting the mission pod beneath a helicopter, each of the longitudinal structural members being provided with at least two of the anchorage points.

Preferably further the chassis also comprises a platform for supporting mission equipment, the platform being carried by the pair of longitudinal structural members.

Preferably further the platform is arranged for supporting mission equipment suspended below it.

Alternatively the platform is arranged for supporting mission equipment secured above it, or the platform is arranged for supporting mission equipment some suspended below it and some secured above it.

Preferably also each longitudinal structural member includes a raised section at its forward end.

Preferably further the raised sections of the longitudinal structural members have a suspension system for supporting mission equipment suspended below it approximately on the centre line of the helicopter.

Preferably further the mission pod is provided with fairings equipped with openable doors for protecting and giving access to at least some of the mission equipment to be supported by the chassis.

Preferably further the pod has mission equipment supported on its chassis.

Preferably further said mission equipment comprises a camera module suspended from the suspension system to be approximately on the centre line of the helicopter.

The present invention also consists in a helicopter on which is mounted a mission pod according to any one of the preceding statements of invention.

Preferably the helicopter cabin floor is substantially free of mission equipment.

Other preferred features of the invention will be apparent from the following description and from the subsidiary claims of the specification.

The invention will now be further described, merely by way of example, by reference to the accompanying schematic drawings, in which :-

- Figure 1 is a side elevation of a helicopter mission system, with certain parts removed for clarity, according to a preferred example of the invention,
- Figure 2 is plan view of the helicopter mission system of Figure 1,
- Figure 3 is a front elevation of the mission system of Figures 1 and 2, with certain parts removed for clarity, mounted beneath a helicopter, and
- Figure 4 is an elevation, on an enlarged scale, of an anchorage point shown in the other drawings.

Referring initially to Figures 1, 2 and 3 of the drawings, a helicopter mission system comprises a mission pod 10 having a chassis 11 for supporting mission equipment. The chassis 11 comprises a pair of parallel longitudinal structural members in the form of two tubes 12 running lengthways of the pod 10. At the rear end of the pod 10, the ends of the tubes 12 are interconnected via corner brackets 13 by a rear tubular crossbar 14 perpendicular to the tubes 12.

Towards the front of the pod 10 the tubes 12 are interconnected via T-brackets 15 by a front tubular crossbar 16 parallel to the rear tubular crossbar 14. Forward of the front tubular crossbar 16, each tube 12 has an upward gooseneck portion 17 leading to a raised section 18.

Hence the chassis 11 includes a rectangular assembly of the tubes 12 and crossbars 14 and 16 at the front end of which are located the raised sections 18 of the tubes 12. The chassis 11 also includes a stiff and strong honeycomb-cored composite platform 19 carried by the pair of tubes 12 and the crossbars 14 and 16.

The pod 10 is provided with four anchorage points 20 attached to the chassis 11, two to each tube 12. An anchorage point 20 is shown on an enlarged scale in Figure 4. Each anchorage point 20 has an anchorage bracket 21 screwed at 22 to one of the tubes 12 and connected through a quick-release pin 23 to a U-shaped bracket 24.

The two arms 25 of the U-shaped bracket 24 are positioned one to each side of one of the two undercarriage crosstubes 26 of the helicopter 27. A shell clamp 28 is clamped over a rubber anti-vibration mount 29 to the crosstube 26 between those two arms 25, and each arm 25 is provided with a bolt 30 bolted through the clamp 28 and through the wall of the crosstube 26 to its interior. Any bending of the undercarriage crosstubes 26 during landings is taken up by some turning of the crosstube 26 relative to the U-shaped bracket 24 of each anchorage point 20 about an axis coaxial with the longitudinal axes of the bolts 30. This also means that the pod 10 does not affect, and in particular does not increase, the stiffness of the crosstubes 26. The clamp 28 spreads the stresses applied to the crosstube 26 by the bolts 30 around the periphery of the crosstube 26.

Figure 1 shows the positions of the four anchorage points 20 clearly, two almost at the rear ends of the tubes 12, and two positioned just behind the front crossbar 16, giving the chassis 11 strong and well spread-out anchorage beneath the helicopter 27 along its centre line.

The raised sections 18 of the tubes 12 carry a suspension system 40 in the form of a turret 41 with stiffening ribs 42 bridging the raised sections 18 and bolted to them by four turret bolts 43. The turret 41 is shown fitted with a forward looking infrared camera module 44 which is suspended below it approximately on the centre line of the helicopter.

The raised sections 18 and gooseneck portions 17 of the tubes 12 are provided with a forward fairing 45 shown in Figures 1 and 2 but omitted from Figure 3 (which gives an unobstructed view of the turret 41 and an outline only of the camera module 44). The forward fairing 45 weatherproofs and gives good aerodynamic properties to the front end of the mission pod 10, and includes a rim seal 46 which seals against the belly of the helicopter 27. The fairing 45 extends rearwardly just past the front crossbar 16 and seals to a front vertical bulkhead 47 secured on and between the tubes 16 just below the platform 19.

Referring particularly to Figure 1, the mission pod is also provided with a rear vertical bulkhead 48 a little forward of the rear anchorage points 20, and an intermediate vertical bulkhead 49 between the bulkheads 47 and 48 and towards the rear of the pod 10. The bulkheads 47-49 divide up the interior of the pod into various compartments as required for the mission equipment (extra to the camera module 44) constituting part of the helicopter mission system as described below. The mission pod also has a U-shape stiffening web 50 parallel to the bulkheads 47-49 a little behind the front bulkhead 47.

The bulkheads 47-49, the stiffening web 50 and the tubes 12 carry a rear fairing 51 behind the rear bulkhead 48, side fairings 52 lengthways of the pod 10, a base plate 53 along the underside of the pod 10 and left and right

openable doors 54 hinged to the base plate 53 at 55; Figure 3 shows the left hand openable door 54 in its open position. The base plate 53 and all of the fairings give good aerodynamic properties and weatherproofing for the mission pod 10, and the openable doors 54 give access to the interior of the relevant compartments in the pod 10 for the purposes of the helicopter mission system, and particularly for access to the otherwise inaccessible mountings and other parts of the mission system.

The mission equipment to be supported by the chassis 11 and suspended below the platform 19 is, of course, dictated by the requirements for the mission for which the helicopter requires the helicopter mission system. The camera module 44 described above is nearly always required, but many other choices are available. In this typical example only, the mission pod 10 includes the mission equipment described below.

Referring now principally to Figures 1 and 2, these show a landing light 60 mounted on the base plate 53 between the front bulkhead 47 and the nearer intermediate bulkhead 49. The landing light 60 is operational projecting below the base plate 53 and retractable to a stowed position shown at 61.

At the rear of the pod 10, there is provided a searchlight 62 suspended below the platform 19 behind the rear bulkhead 48 and projecting through the rear fairing 51. Also behind the rear bulkhead are provided a slaver unit

63 to couple the directional instructions given to the camera module 44 with those for the searchlight 62, and a control box 64 for the searchlight 62.

The compartment between the rear bulkhead 48 and the nearer intermediate bulkhead 50 has an open base and contains a loudspeaker system 65.

In the compartment between the front bulkhead 47 and the intermediate bulkhead 49, and accessible through the doors 54 are an audio amplifier 66 for the loudspeaker system 65, an electronics control unit 67 for the camera module 44 and a navigational control box 68. This compartment also contains a tracker unit 69 for the location of stolen vehicles equipped with a tracker system transmitter; the aerials 70 for the tracker unit are mounted on the doors 54 as can also be seen in Figure 3. Below the amplifier 66 and the tracker unit is mounted an aircraft direction finding antenna 71 on the underside of the base plate 53. This compartment also contains a global positioning system / a communications microwave downlink 72.

None of the equipment just described is in the cabin of the helicopter, leaving it clear for personnel and any other items to be transported or used in the helicopter for its mission. Thus the helicopter cabin floor is substantially free of mission equipment.

It will be appreciated that without the use of the mission pod, the camera module, searchlight and loudspeakers would be mounted on one or both of the crosstubes of the helicopter, offset from the centre line of the helicopter, and fully open to weather conditions. All of the other mission equipment would be in the cabin of the helicopter, causing unproductive clutter and restriction of valuable space.

In a modification of the preferred example described above in relation to the accompanying drawings, the platform 19 may be located at a lower level in the pod 10, but still forming part of the chassis 11. This modified platform has mission equipment secured above it in the pod 10, and may have some mission equipment suspended below it.

CLAIMS

1. A helicopter mission system comprising a mission pod having a chassis for supporting mission equipment and provided with at least two anchorage points attached to the chassis for mounting the mission pod beneath a helicopter.
2. A helicopter mission system according to Claim 1 wherein the chassis and anchorage points are arranged for mounting the mission pod along the centre line of the helicopter.
3. A helicopter mission system according to Claim 1 or 2 wherein the mission pod is provided with at least three anchorage points attached to the chassis for mounting the mission pod beneath the helicopter.
4. A helicopter mission system according to Claim 3 wherein the chassis comprises a pair of longitudinal structural members each being provided with at least one of the anchorage points.
5. A helicopter mission system according to Claim 4 wherein the chassis is provided with at least four anchorage points attached to the chassis for mounting the mission pod beneath a helicopter, each of the longitudinal structural members being provided with at least two of the anchorage points.

6. A helicopter mission system according to Claims 4 or 5 wherein the chassis also comprises a platform for supporting mission equipment, the platform being carried by the pair of longitudinal structural members.

7. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment suspended below it.

8. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment secured above it.

9. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment some suspended below it and some secured above it.

10. A helicopter mission system according to any one of Claims 4 to 9 wherein each longitudinal structural member includes a raised section at its forward end.

11. A helicopter mission system according to Claims 2 and 10 wherein the raised sections of the longitudinal structural members have a suspension system for supporting mission equipment suspended below it approximately on the centre line of the helicopter.

12. A helicopter mission system according to any one of the preceding claims wherein the mission pod is provided with openable doors for protecting and giving access to at least some of the mission equipment to be supported by the chassis.

13. A helicopter mission system according to any one of the preceding claims wherein the pod has mission equipment supported on its chassis.

14. A helicopter mission system according to Claims 11 and 13 wherein said mission equipment comprises a camera module suspended from the suspension system to be approximately on the centre line of the helicopter.

15. A helicopter mission system substantially as described herein with reference to and as shown in the accompanying drawings.

16. A helicopter on which is mounted a mission pod according to any one of the preceding claims.

17. A helicopter according to Claim 16 wherein the helicopter cabin floor is substantially free of mission equipment.

Amendments to the claims have been filed as follows

CLAIMS

1. A helicopter mission system comprising a mission pod having a chassis for supporting mission equipment and provided with at least two anchorage points attached to the chassis for mounting the mission pod beneath a helicopter, wherein the mission equipment is protected by weatherproofing fairings.
2. A helicopter mission system according to Claim 1 wherein the chassis and anchorage points are arranged for mounting the mission pod along the centre line of the helicopter.
3. A helicopter mission system according to Claim 1 or 2 wherein the mission pod is provided with at least three anchorage points attached to the chassis for mounting the mission pod beneath the helicopter.
4. A helicopter mission system according to Claim 3 wherein the chassis comprises a pair of longitudinal structural members each being provided with at least one of the anchorage points.
5. A helicopter mission system according to Claim 4 wherein the chassis is provided with at least four anchorage points attached to the chassis for mounting the mission pod beneath a helicopter, each of the longitudinal structural members being provided with at least two of the anchorage points.

6. A helicopter mission system according to Claims 4 or 5 wherein the chassis also comprises a platform for supporting mission equipment, the platform being carried by the pair of longitudinal structural members.

7. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment suspended below it.

8. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment secured above it.

9. A helicopter mission system according to Claim 6 wherein the platform is arranged for supporting mission equipment some suspended below it and some secured above it.

10. A helicopter mission system according to any one of Claims 4 to 9 wherein each longitudinal structural member includes a raised section at its forward end.

11. A helicopter mission system according to Claims 2 and 10 wherein the raised sections of the longitudinal structural members have a suspension system for supporting mission equipment suspended below it approximately on the centre line of the helicopter.

12. A helicopter mission system according to any one of the preceding claims wherein the mission pod is provided with openable doors for protecting and giving access to at least some of the mission equipment to be supported by the chassis.

13. A helicopter mission system according to any one of the preceding claims wherein the pod has mission equipment supported on its chassis.

14. A helicopter mission system according to Claims 11 and 13 wherein said mission equipment comprises a camera module suspended from the suspension system to be approximately on the centre line of the helicopter.

15. A helicopter mission system substantially as described herein with reference to and as shown in the accompanying drawings.

16. A helicopter on which is mounted a mission pod according to any one of the preceding claims.

17. A helicopter according to Claim 16 wherein the helicopter cabin floor is substantially free of mission equipment.



Application No: GB 9813503.1
Claims searched: 1-17

Examiner: C B VOSPER
Date of search: 17 May 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.Q): B7W(WFE,WFH,WFX,WHXX,W41,W43)

Int CI (Ed.6): B64C 25/00,25/02,25/06,27/00,27/04;
B64D 7/00,7/02,7/04,7/06,7/08,47/00,47/08

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X:Y	GB 1350618	ROTORCRAFT (whole document)	1,2 : 8
X:Y	US 5710945	THOMPSON (whole document)	1,2 : 8
X:Y	US 5365291	MAEDA (whole document)	1-4,6,7 at least : 8
X:Y	US 5093677	McMAHON (whole document)	1-7,10, 11,13,14 : 8
X:Y	US 4752791	ALLRED (figs. 1 and 2; col. 2, line 4 et seq.; note platform 64)	1-3 at least : 8
X:Y	US 4114839	SIBLEY (fig. 3; note camera 300)	1 at least : 8

X Document indicating lack of novelty or inventive step
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